Interaction Instruction Sheet of PivotSlice

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PivotSlice is an interactive visualization system for exploring datasets containing multiple heterogeneous facets which derive implicit relations as well as explicit relational references between data items, such as online scientific literature databases. The PivotSlice system was developed with the journal paper *Interactive Exploration of Implicit and Explicit Relations in Faceted Datasets* [1]. For more information on the design and descriptions of visualizations and interactions, please refer to the paper and accompanying video online at www.cs.toronto.edu/jianzhao. The source code of this research prototype can be accessed on GitHub: https://github.com/jeffjianzhao/PivotSlice. Please contact me at jianzhao@dgp.toronto.edu to request the source code. Note that bugs may exist in the program as a prototype.

1. **Program**
   1) Launch
      - Use command line: java -jar pivotslice.jar *datafile*
   2) Environment
      - JRE 1.7 or above
      - Best for running under Windows 7
      - Recommended screen resolution 1280x960 or above
   3) Data
      - Two data formats can be loaded: binary format (.dat) and json format (.json), which both use similar data scheme of Microsoft Academic Search API [2].
2. **Data Filter**
   1) Create Filter
      - Click the green "plus" button when there is a facet attribute specification string in the Search Box on the Search and Operation Panel (see 3.1 Add Attributes for details).
      - Drag and drop an Attribute Label, a Facet Panel, or a Data Filter from elsewhere onto the "others" Data Filter shown in light gray rectangles
   2) Modify Filter
      - See 3. Facet Panel and Attributes for details
   3) Reorder Filters
      - Drag and drop a Data Filter onto the white gap between two filters on a Query Axis
   4) Delete Filter
      - Click the gray cross button at the corner of a Data Filter
   5) Minimize/Maximize Filter
      - Click the gray double-arrow button at the corner of a Data Filter
3. **Facet Panel and Attributes**
   1) Add Attributes
      - Through Search Box[1] on the Search and Operation Panel:

[1] Prefix strings for facets contains: author, conference, journal, year, keyword, citation, reference, in-degree, and out-degree; if no prefix string is specified, a search within attributes of all the facets (including paper titles) will be initiated.

1. For numerical facets, type */prefix startvalue-endvalue* and pause a bit (until background color changes), then drag across the green "plus" button and drop onto a Data Filter
2. For categorical facets, type */prefix keyword* and pause a bit, then select an item in the drop down menu, next drag across the green "plus" button and drop onto a Data Filter

- Through Information Panel and History Panel
  1. Single Attribute: Drag and drop the Attribute Label onto a Data Filter
  2. Multiple Attributes (Information Panel): While holding Ctrl, drag any Attribute Label on that facet to add all attributes by default; attributes can be excluded or included by clicking on it (while holding Ctrl)
- Though Existing Data Filters
  1. Drag and drop a Data Filter, a Facet Panel or an Attribute Label from another filter onto the desired Data Filter
  2. If Ctrl is down, drag and drop of a Data Filter, a Facet Panel or an Attribute Label becomes a copy operation without modifying the original filter

2) Modify and Navigate Attributes
   - For numerical facets: use the black arrows to adjust starting and ending numbers
   - For categorical facets: use the black arrows to navigate through the attributes; and use the red cross button to delete an attribute
3) Delete Facet Panel
   - Click the black cross button on one side of a Facet Panel

4. Query Table and Query Cell

1) Layout Nodes in a Query Cell
   - Align with a facet: toggle the black circle on one side of a Facet Panel
   - Matrix-Style layout: click the button on the Search and Operation Panel; or use the context menu
   - Refresh layout: click the re-layout button on the Search and Operation Panel
2) Select a Query Cell or Node(s)
   - Query Cell: click anywhere that is empty in a Query Cell
   - Single Node: click a node on the Main Canvas; if Ctrl is down, the clicked node will be added or removed from the current selection, depending on its selection status
   - Multiple Nodes
     1. Through the Context Menu: select all (within the selected cell); select citations or references relative to the current selected nodes
     2. Through the Polygon Selection Tool: hold Shift, first double click to define a starting point, then single click to add waypoints, finally double click to finish the selection polygon; if Ctrl is also down, only the selected nodes and their neighbors in the polygon area will be selected
3) Display Links
   - Use options of the ComboBox on the Search and Operation Panel
4) Aggregate Nodes
   - Toggle the horizontal or vertical arrow buttons on the Search and Operation Panel; or use the context menu
   - Minimize a Data Filter (which collapses the row or column and aggregates the nodes)

5. Data Management

1) Fetch References/Citations[2]
   - Use the corresponding buttons on the Search and Operation Panel or the context menu to query references/citations of the selected publications online
2) Search Publications Online[2]
   - Type the keyword and click the green "plus" button, a dialog with a list of search results will then appear, then selects the publications to add and click the "add" button on the dialog
3) Prune Data
   - Use the "prune data" button on the Search and Operation Panel or the context menu
   - If no nodes is selected, all nodes in the selected Query Cell will remain, otherwise only the selected nodes will remain

6. Misc

1) Cell Relation Panel: use the black arrow to navigate different metrics
2) Information Panel: the ComboBox can be used to navigate different publications within current selection
3) History Panel: click the thumbnail loads the historical status onto the Main Canvas

7. References

1) Jian Zhao, Christopher Collins, Fanny Chevalier, and Ravin Balakrishnan. Interactive Exploration of Implicit and Explicit Relations in Faceted Datasets. *IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST 2013)*, 19(12), pp. 2080-2089, Dec 2013.
2) Microsoft Academic Search API v1.3, http://academic.research.microsoft.com/about/Microsoft%20Academic%20Search%20API%20User%20Manual.pdf
3) Microsoft Academic Search Java SDK. https://code.google.com/p/academic-search-java-sdk/

[2] Live online searching may take a long time through the Microsoft Academic Search API.